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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the manufacture approach of the fixture for semi-conductor manufacture of removing the impurity of the front face of quartz glass especially using halogen content gas, about the manufacture approach of the fixture for semi-conductor manufacture.

[0002]

[Description of the Prior Art] It is known for heat-treating the charge of natural siliceous powder Suehara at 1000-1200 degrees C in the adjustment ambient atmosphere containing a halogen or its compound that the raw material for quartz glass of a high grade will be obtained so that it may be shown in the former, for example, JP,2-30628,A. According to this approach, although the high grade raw material for quartz glass can be obtained, if the method of profit and the usual tube drawing method are performed for the tubular object of quartz glass, for example using this raw material, a metal impurity will mix into a quartz-glass ingredient from a furnace atmosphere. Moreover, if the method of profit and an acid hydrogen gas burner are performed, a metal impurity will mix a complicated configuration object into a quartz-glass ingredient from said gas burner.

[0003] Therefore, sufficient purity was not able to be obtained as a final fixture for semi-conductor manufacture. Especially, contamination of the quartz-glass ingredient by alkali metal, such as Na, K, and calcium, and alkaline earth metal was remarkable. In order to solve this, purification processing by halogen gas was performed in the final product phase from before.

[0004]

[Problem(s) to be Solved by the Invention] However, it deformed, when elevated-temperature purification processing by halogen gas was performed in the final product phase after the fixture assembly for semi-conductor manufacture, and the technical problem that the thing of a predetermined configuration was not obtained occurred. If it illustrates concretely and a boat with four bearing bars in which the predetermined width of face for carrying out set-up maintenance of two or more semi-conductor wafers at intervals of predetermined and the slot on the depth were formed will be processed in a final product phase Homogeneity, such as a flute width, was spoiled for high temperature processing, and the location of four slots on the same flat surface shifted in deformation of a bearing bar etc., and the technical technical problem of it becoming impossible to set up a wafer appropriately occurred. Moreover, in order to carry out purification processing of the final product by halogen gas, the big furnace which can contain it is required and the price of the fixture for semi-conductor manufacture was made high after all.

[0005] It is invention made in order that this invention might solve the above-mentioned technical technical problem, and purity sufficient as a fixture for semi-conductor manufacture can be obtained, and there is no deformation of a member, a predetermined dimension configuration can be made, and it aims at offering the manufacture approach of the fixture for semi-conductor manufacture that moreover the cheap fixture for semi-conductor manufacture is obtained.

[0006]

[Means for Solving the Problem] The manufacture approach of the fixture for semi-conductor manufacture concerning this invention is characterized by to consist of the process which manufactures the member which constitutes the fixture for semi-conductor manufacture from quartz glass, a process which carries out the set of a reactor core of said member, supplies halogen content gas to a furnace under predetermined processing conditions, and purifies said member, and an assembly process which use said purified member as the fixture for assembly semi-conductor manufacture.

[0007]

[Function] After the manufacture approach of the fixture for semi-conductor manufacture concerning this invention manufactures the member which constitutes the fixture for semi-conductor manufacture, in order to purify said member by halogen content gas under predetermined processing conditions, there is no deformation of a member, a predetermined dimension configuration can be made to the member, and, moreover, the cheap fixture for semi-conductor manufacture is obtained in it.

[0008]

[Example] The semi-conductor wafer boat which shows the example of this invention to drawing 1 is explained to an example. First, the member which constitutes a semi-conductor wafer boat is manufactured by refining after grinding natural Xtal and carrying out melting shaping of each part material by the approach learned from the former. The semi-conductor wafer boat consists of the bearing bars 1, 2, and 3 and the both-sides frames 4 and 5 of quartz glass, as shown in drawing. as for the bearing bars 1, 2, and 3 of said quartz glass, the cylinder-like shanks 1a, 2a, and 3a form in the ends of nothing and the bearing bars 1, 2, and 3 of these quartz glass at one the prismatic form 10mm and whose die length one side is 400mm -- having -- these shanks 1a, 2a, and 3a -- on the way -- being alike -- abbreviation -- the stop crevice for immobilization (not shown) which consists of an parallel slot of two articles is formed.

[0009] Moreover, many slots 7 which have the taper section of about 70 degrees to the middle in a width of 0.5mm and a depth of 3mm are formed in the top face of the bearing bars 1, 2, and 3 of said quartz glass by about 5mm regular intervals. Moreover, said both-sides frames 4 and 5 are formed in tabular, and the mounting hole (not shown) where the shanks 1a, 2a, and 3a of the bearing bars 1, 2, and 3 of said quartz glass are inserted in the position is formed.

[0010] In addition, the assembly of these members inserts the bearing bars 1, 2, and 3 of said quartz glass in the mounting hole (not shown) of the both-sides frames 4 and 5 which consist of a quartz-glass plate. The tabular stop plate 6 which consists of a quartz-glass piece by which joining was carried out to side frames 4 and 5 in ends is inserted in said stop crevice formed in the bearing bars 1, 2, and 3 of said quartz glass, and it is carried out by fixing the bearing bars 1, 2, and 3 of quartz glass to the both-sides frames 4 and 5 at an angle of predetermined.

[0011] Moreover, in these members before an assembly, the impurity (aluminum:15ppm, Na:1.0ppm, K:1.1 ppm, calcium:1.5ppm, and Fe:2ppm) was contained as a result of metal content analysis. Thus, before assembling the constituted member 1, 2, and 3, i.e., the bearing bars of quartz glass, and side frames 4 and 5, a member is laid in the high-purity-graphite fixtures 8 and 9 as shown in drawing 2 and drawing 3 , the set of a reactor core is carried out, and purification processing is carried out using hydrogen chloride gas.

[0012] 1150 degrees C costs whenever [furnace temperature], and the purification processing is HCl gas 0.3 l/min And 02 It is gas 3 l/min The furnace was supplied under conditions and processing of 100 hours was performed. And the purity of the boat assembled using these members and the deformation of the bearing bar 1 of said assembled boat were measured. Measurement of deformation measured the maximum deformation alpha of a bearing bar 1, as shown in drawing 4 . The measurement result is shown in a table 1. In addition, drawing 4 is the side elevation only for a support rod part of the assembled boat.

[0013] Moreover, each part material of the bearing bars 1, 2, and 3 of quartz glass and the both-sides frames 4 and 5 obtained like the example as an example 1 of a comparison is made into 1150 degrees C after assembly whenever [same processing conditions / as an example /, i.e., furnace temperature,], and it is HCl gas 0.3 l/min And 02 It is gas 3 l/min The furnace was supplied under conditions and the

processing was performed for 100 hours. And the purity of the assembled boat and the deformation of the bearing bar 1 of the assembled boat were measured. Measurement of deformation measured the maximum deformation alpha of a bearing bar 1, as shown in drawing 4. The measurement result is shown in a table 1.

[0014] Moreover, the example 2 of a comparison carried out melting shaping of each configuration member for the charge of natural siliceous powder Suehara after purification processing, and measured the purity of the boat after an assembly, and the deformation of a bearing bar 1. That is, the baking object which purification processing quenched the nature raw material of a natural silica after heating at the temperature of 500-700 degrees C, and was obtained in the charge of natural siliceous powder Suehara is ground to 60-200 meshes, and then the above-mentioned baking grinding object is immersed in the mixed liquor of a hydrofluoric acid and a hydrochloric acid, and the above-mentioned immersion processing grinding object is performed by heat-treating at the temperature of 1000-1200 degrees C in the adjustment ambient atmosphere containing a halogen or its compound. Melting shaping was carried out after that, each part material of the bearing bars 1, 2, and 3 of quartz glass and the both-sides frames 4 and 5 was formed, and these configuration member was assembled. The measurement result is shown in a table 1.

[0015]

[A table 1]

| 支持棒の変形量 (mm) | 純 度 | | |
|------------------|----------|---------|----------|
| | Na (ppm) | K (ppm) | Ca (ppm) |
| 実施例 | 0.1 | < 0.1 | < 0.1 |
| 比較例1 | 1.3 | < 0.1 | < 0.1 |
| 比較例2 | 0.2 | 0.5 | 0.4 |

[0016] As shown in a table 1, an example has markedly little deformation of a bearing bar compared with the example 1 of a comparison, and the purity of an example of the whole boat is very high compared with the example 2 of a comparison. And since purification processing is carried out by the member before assembly, a big furnace is not required, and the furnace for processing can be made small.

[0017] In addition, although the above-mentioned example explained using the semi-conductor wafer boat, if it is a fixture for semi-conductor manufacture using quartz glass, naturally this invention can be applied, for example, it can apply also to fixtures for semi-conductor manufacture, such as a work tube and a semi-conductor wafer boat conveyance fixture. Moreover, although the above-mentioned example showed the case where hydrogen chloride gas was used as raw gas, if it is halogen content gas, it can use similarly. Halogen simple substance gas and halogenated compound gas are contained in halogen content gas.

[0018]

[Effect of the Invention] After manufacturing the member which constitutes the fixture for semi-conductor manufacture, in order that the manufacture approach concerning this invention may purify said member for the member by halogen content gas under predetermined processing conditions, Purity sufficient as a fixture for semi-conductor manufacture can be obtained, and there is no deformation of a member, a predetermined dimension configuration can be made, the furnace for moreover carrying out

purification processing can be miniaturized, and the cheap fixture for semi-conductor manufacture can be obtained.

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TECHNICAL FIELD

[Industrial Application] This invention relates to the manufacture approach of the fixture for semiconductor manufacture of removing the impurity of the front face of quartz glass especially using halogen content gas, about the manufacture approach of the fixture for semi-conductor manufacture.

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PRIOR ART

[Description of the Prior Art] It is known for heat-treating the charge of natural siliceous powder Suehara at 1000-1200 degrees C in the adjustment ambient atmosphere containing a halogen or its compound that the raw material for quartz glass of a high grade will be obtained so that it may be shown in the former, for example, JP,2-30628,A. According to this approach, although the high grade raw material for quartz glass can be obtained, if the method of profit and the usual tube drawing method are performed for the tubular object of quartz glass, for example using this raw material, a metal impurity will mix into a quartz-glass ingredient from a furnace atmosphere. Moreover, if the method of profit and an acid hydrogen gas burner are performed, a metal impurity will mix a complicated configuration object into a quartz-glass ingredient from said gas burner.

[0003] Therefore, sufficient purity was not able to be obtained as a final fixture for semi-conductor manufacture. Especially, contamination of the quartz-glass ingredient by alkali metal, such as Na, K, and calcium, and alkaline earth metal was remarkable. In order to solve this, purification processing by halogen gas was performed in the final product phase from before.

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

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MEANS

[Means for Solving the Problem] The manufacture approach of the fixture for semi-conductor manufacture concerning this invention is characterized by to consist of the process which manufactures the member which constitutes the fixture for semi-conductor manufacture from quartz glass, a process which carries out the set of a reactor core of said member, supplies halogen content gas to a furnace under predetermined processing conditions, and purifies said member, and an assembly process which use said purified member as the fixture for assembly semi-conductor manufacture.

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OPERATION

[Function] After the manufacture approach of the fixture for semi-conductor manufacture concerning this invention manufactures the member which constitutes the fixture for semi-conductor manufacture, in order to purify said member by halogen content gas under predetermined processing conditions, there is no deformation of a member, a predetermined dimension configuration can be made to the member, and, moreover, the cheap fixture for semi-conductor manufacture is obtained in it.

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EXAMPLE

[Example] The semi-conductor wafer boat which shows the example of this invention to drawing 1 is explained to an example. First, the member which constitutes a semi-conductor wafer boat is manufactured by refining after grinding natural Xtal and carrying out melting shaping of each part material by the approach learned from the former. The semi-conductor wafer boat consists of the bearing bars 1, 2, and 3 and the both-sides frames 4 and 5 of quartz glass, as shown in drawing. as for the bearing bars 1, 2, and 3 of said quartz glass, the cylinder-like shanks 1a, 2a, and 3a form in the ends of nothing and the bearing bars 1, 2, and 3 of these quartz glass at one the prismatic form 10mm and whose die length one side is 400mm -- having -- these shanks 1a, 2a, and 3a -- on the way -- being alike -- abbreviation -- the stop crevice for immobilization (not shown) which consists of an parallel slot of two articles is formed.

[0009] Moreover, many slots 7 which have the taper section of about 70 degrees to the middle in a width of 0.5mm and a depth of 3mm are formed in the top face of the bearing bars 1, 2, and 3 of said quartz glass by about 5mm regular intervals. Moreover, said both-sides frames 4 and 5 are formed in tabular, and the mounting hole (not shown) where the shanks 1a, 2a, and 3a of the bearing bars 1, 2, and 3 of said quartz glass are inserted in the position is formed.

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[0011] Moreover, in these members before an assembly, the impurity (aluminum:15ppm, Na:1.0ppm, K:1.1 ppm, calcium:1.5ppm, and Fe:2ppm) was contained as a result of metal content analysis. Thus, before assembling the constituted member 1, 2, and 3, i.e., the bearing bars of quartz glass, and side frames 4 and 5, a member is laid in the high-purity-graphite fixtures 8 and 9 as shown in drawing 2 and drawing 3, the set of a reactor core is carried out, and purification processing is carried out using hydrogen chloride gas.

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[0015]

[A table 1]

| | 支持棒の変形量 (mm) | 純 度 | | |
|-------|------------------|----------|---------|----------|
| | | Na (ppm) | K (ppm) | Ca (ppm) |
| 実施例 | 0.1 | < 0.1 | < 0.1 | < 0.1 |
| 比較例 1 | 1.3 | < 0.1 | < 0.1 | < 0.1 |
| 比較例 2 | 0.2 | 0.5 | 0.4 | 0.7 |

[0016] As shown in a table 1, an example has markedly little deformation of a bearing bar compared with the example 1 of a comparison, and the purity of an example of the whole boat is very high compared with the example 2 of a comparison. And since purification processing is carried out by the member before assembly, a big furnace is not required, and the furnace for processing can be made small.

[0017] In addition, although the above-mentioned example explained using the semi-conductor wafer boat, if it is a fixture for semi-conductor manufacture using quartz glass, naturally this invention can be applied, for example, it can apply also to fixtures for semi-conductor manufacture, such as a work tube and a semi-conductor wafer boat conveyance fixture. Moreover, although the above-mentioned example showed the case where hydrogen chloride gas was used as raw gas, if it is halogen content gas, it can use similarly. Halogen simple substance gas and halogenated compound gas are contained in halogen content gas.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing 1 is the front view of a semi-conductor wafer boat.

[Drawing 2] Drawing 2 is the perspective view of the fixture used for purification processing of a bearing bar.

[Drawing 3] Drawing 3 is the perspective view of the fixture used for purification processing of a side frame.

[Drawing 4] Drawing 4 is drawing for explaining the deformation of a bearing bar.

[Description of Notations]

1 Bearing Bar of Quartz Glass

2 Bearing Bar of Quartz Glass

3 Bearing Bar of Quartz Glass

4 Side Frame

5 Side Frame

6 Stop Plate

7 Slot

8 Fixture

9 Fixture

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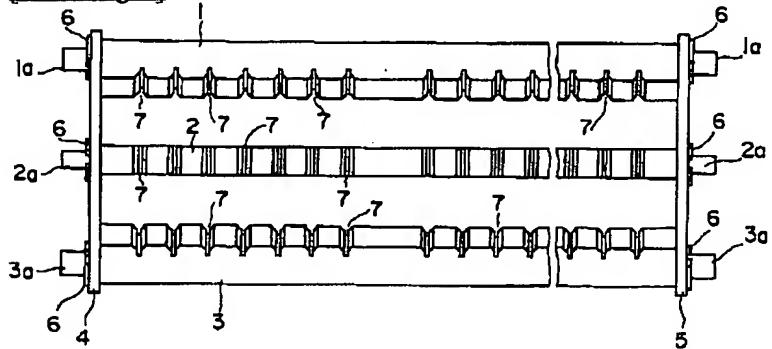
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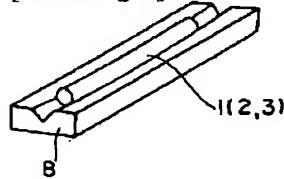
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DRAWINGS

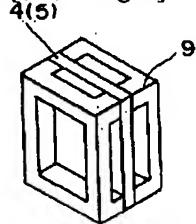
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Drawing 4]



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CLAIMS

[Claim(s)]

[Claim 1] The manufacture approach of the fixture for semi-conductor manufacture characterized by to consist of the process which manufactures the member which constitutes the fixture for semi-conductor manufacture from quartz glass, a process which carries out the set of a reactor core of said member, and supplies halogen content gas to a furnace under predetermined processing conditions, and said member purifies, and an assembly process which uses said purified member as the fixture for assembly semi-conductor manufacture.

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